along was that the nuclear waste had heated and exploded thermally, or perhaps chemically. Especially during the first two years, nuclear wastes can heat up and possibly explode, unless they are carefully cooled. Medvedev notes that his theory, and a study published by the US Oak Ridge National Laboratory in 1980, conclude there was a single, major disaster on the basis of the ecological literature — evidence that the Los Alamos report ignores.

The Los Alamos report asserts that the incident is relevant "in the light of the current nuclear waste disposal questions facing the United States" but does not explain just how. But it implies that even when nuclear wastes were disposed of in the sloppiest manner imaginable, they caused no single catastrophe. **Deborah Shapley**

Britain in space

Up, up and away

The British government, not usually enthusiastic about spending public money, seems keen to find the cash for a major national programme in remote sensing. Members of a "task force" who have spent the past six weeks working out the details, were putting the finishing touches to their report earlier this week.

Behind the government's enthusiasm is its wish to make the best use of the European Space Agency's (ESA's) Earth Resources Satellite (ERS1) to which it has already pledged £28 million, or 13 per cent of the cost. Britain does not seem to be the only country to find an interest in remote sensing. All ESA's 13 member states are expected to meet next week's deadline for pledging their contributions to the satellite, even though it will be built under ESA's optional applications programme.

Assuming that the money is forthcoming, ERS1 will be a pre-operational ocean-monitoring satellite following along the lines of Seasat, the United States equivalent, which hinted at the usefulness of looking at the oceans in microwave before it went out of service after only three months.

Thus the three instruments that will make up the ERS1 payload — a synthetic aperture radar, a wind scatterometer and a radar altimeter — will all record in the microwave band. The satellite's low polar orbit will give it global coverage for measuring such variables as wind speed, wave height and polar ice cover. Data are expected to be of use to the scientific community, weather forecasters and shipping and offshore oil companies.

Britain's singular interest in ERS1 was stimulated last month when a team from the Science and Engineering Research Council's Rutherford Laboratory won a competition to design a fourth instrument for the payload — an infrared scanning radiometer to measure sea-surface temperature to within half a degree Kelvin.

But the instrument, costing about £1 million, must be built with British money.

If the general level of interest is anything to go by, however, the Rutherford team has little cause for anxiety. The "task force", which includes representatives from the Science and Engineering Research Council, the Natural Environment Research Council, the Meteorological Office, the Royal Aircraft Establishment at Farnborough, industry and the Department of Industry, has been drawing up plans for a far grander national remote sensing programme that could involve spending more than £4 million. The report addresses three questions: the content of a programme of fundamental research into understanding microwave data; how to get the data to the user; and how to exploit commercially remote sensing in general.

The most costly consideration could be that of disseminating data from ERS1. ESA plans to set up a central ground receiving station at Kiruna in Sweden from which data can be relayed to agencies in individual nations. But the British study describes several options for a national ground station that could receive data directly from the satellite. These range from a £4 million station capable of receiving 120 megabits per second from the synthetic aperture radar to a much cheaper station capable of handling data at no more than 1 megabit per second. The cost would almost certainly have to be met by the industry department, which may try to persuade industry itself to chip in.

The data-handling part of the national programme could ride on the tide of the British government's general enthusiasm for information technology, so that it is no surprise that the report will be placed before Kenneth Baker, minister for information technology. The other important aspect for the government, however, is how to make money out of what is widely heralded as a growing international market. One option that the industry department is considering is to persuade private industry to set up a company to sell remote sensing data, as well as hardware and software for ground stations and satellite payloads.

The final details on the form of the national programme will probably take some months to work out. In the meantime, the plans seem to beg two questions. Are remote sensing data sufficiently attractive for potential users to pay for them? And is Britain, which has no national space agency, sufficiently well organized. On the first point, the industry department seems aware that it will be treading in the dark. But an earlier survey of more than 100 potential users has persuaded it that the risk could be worth taking, especially for ocean monitoring. And the civil servants who have been debating the merits of a national space agency for some time, could be encouraged by a decision to embark on a remote sensing programme. **Judy Redfearn**

Polish universities

Warsaw's rector

Poland's Council of Ministers has resumed consideration of two bills aimed at restructuring Polish higher education, apparently undismayed that the replacement of Dr Henry Samsonowicz as rector of Warsaw University is regarded in academic circles as a confirmation of growing fears for the future of scholarly life.

Dr Samsonowicz became rector in September 1980, under a compromise arrangement between the old system of government appointment of rectors and the promised reform by which the rector would be elected by the academic community. Subsequently, he was confirmed in office by a free election in which academics, students and university auxiliary staff were represented.

Since the imposition of martial law, Samsonowicz has been under increasing pressure and, according to some sources, was temporarily detained during the round-up of intellectuals in the first few days after the military take-over. A few weeks ago, he was expelled from the Polish United Workers' Party, since when his dismissal has been thought to be only a matter of time.

Nevertheless, the announcement that Dr Samsonowicz's "resignation had been accepted" caused a major wave of protests by Warsaw academics and students. At one point, all lectures were stopped in Warsaw University for 15 minutes to allow students and staff to sign protest letters.

The new rector, selected by the Minister of Science, Higher Education and Technology, is Professor Lazimierz Albin Dobrowolski, head of the department of zoology and ecology. In spite of the unfortunate circumstances of his appointment, Professor Dobrowolski does not seem as severe a hard-liner as some pessimists have assumed.

In a discussion on the proposed reforms of academic life in November 1980, he accepted as necessary the demands for reforms at all levels of education. He even implied that, theoretically, the universities already possess the right to make changes in their syllabuses which, if true, would make many of the reforms promised by the Lodz accords of February 1981 merely a re-statement of powers which the universities already possessed but had not used.

With martial law, the reforms were cancelled and university life reverted to the statutes of 1958, which place full administrative power in the hands of the rector and reduce university senates and faculty councils to a merely consultative role. Many features of the pre-Lodz syllabuses, including compulsory Russian, have been restored.

How far the proposed new law will embody these "temporary" measures is not clear. As early as last summer, the then minister, Dr Jerzy Nawrocki, tried to

emasculate the promised bill by last minute amendments which he introduced unilaterally. At that time, the minister's action was thwarted by the threat of a nationwide university strike. Strikes, of course, are now illegal under martial law.

Vera Rich

Planetary science

Going downhill

Washington

Ever since Mr George A. Keyworth II, the President's science adviser, made some remarks to the effect that it had already had its day, planetary science has been struggling to find favour in Washington. Its trials are continuing, for its traditional patron, the National Aeronautics and Space Administration (NASA), is cutting back support, and it is not clear that the National Science Foundation (NSF), the logical alternative patron, will take up the slack. Although much more than hardware is involved, the controversy centres at the moment on the imminent closure of the relatively new Infrared Telescope Facility (IRTF) atop an extinct volcano on Mauna Kea, Hawaii.

Clearly, the entire field of astronomy is not going to get everything it wants from the government. For instance, a major study for the National Academy of Sciences (NAS) of future astronomical needs, chaired by George Field, director of the Harvard Smithsonian Center for Astrophysics (see *Nature* 8 April, p.482), has produced a list of desirable future facilities requiring \$1,700 million in expenditure over the next decade. The problem, however, is how to set priorities — a task scientists are reluctant to take on, with the result that it falls to the budget men in Washington.

Earlier this year, the Office of Management and Budget (OMB) told NASA that it could have only two of its three major efforts in astronomy. NASA opted to keep the space telescope, scheduled for launch in 1985, and the science programme for the space shuttle. This means that NASA's third major effort, planetary science, must suffer: the Earth and Planetary Sciences Division of NASA will be cut by half in 1983 compared with 1981, if the proposed \$61 million cut is not restored when Congress considers the NASA budget later this year.

The cuts affect funds that support young graduate students entering planetary science and astronomy, and small grants to astronomers around the United States, away from major facilities. Among the programmes axed was the Venus Orbiting Imaging Radar (VOIR) and funds were not restored for a US Halley's comet probe to complement the Giotto project. Moreover, although support for the solar-polar mission has risen to \$21 million, the increase supports only American work aboard the European spacecraft.

But the most conspicuous cut in the fiscal 1983 budget was the IRTF, which sits 13,000 feet above sea level on Mauna Kea. The IRTF was a pioneering facility built by NASA to observe the planets as support for Voyager and other missions. Its tasks include monitoring volcanism on Io and plotting the infrared signatures of the outer planets and their possible moons.

Axing the IRTF was not an arbitrary decision. All NASA facilities are supposed to support actual missions, and no US spacecraft will encounter a planet until Voyager reaches Uranus on 24 January 1986. Moreover, according to a policy statement made some years ago, all ground-based telescopes funded by the government should be supported by NSF, the government's basic research agency.

On 1 January 1983, the IRTF will be homeless, patronless and mothballed unless Congress restores its \$1.7 million annual operating cost in the NASA budget. NASA has recommended that NSF picks up this tab, but the NSF budget for 1983 is more or less set. Mauna Kea's administrators will have to file a proposal to NSF to get the money — but even then may well not succeed.

John T. Jeffries, director of the Institute for Astronomy at Mauna Kea (which includes other facilities besides the IRTF), is urging Congress to restore the funds to NASA. For the moment, Jeffries says he is reluctant to ask NSF for the money, which at this late stage could come only from other astronomers.

If the telescope goes, United States astronomers would have no national centre for infrared work — either within the Solar System or outside it. The infrared facilities at Wyoming and Arizona serve mostly local astronomers, while a comparable facility on Mauna Kea, the United Kingdom Infrared Telescope, is available mainly to British astronomers.

The Mauna Kea IRTF's plight is typical of the dilemma facing much of the basic science carried out by mission agencies in the United States. The facility is built and operated by NASA, so dedicates half its work in support of NASA's planetary exploration programme. But applications to work on objects outside the Solar System, such as the gas clouds of Orion, are more than double IRTF's applications for planetary work.

But whatever the merits of Mauna Kea's IRTF or the fate of Jeffries' attempts to save it, the issue not being discussed is the one Keyworth raised originally, of whether planetary science has had its day and deserves lower priority than other branches of astronomy. According to Field, chairman of the NAS study, "traditionally, NASA has tried to encourage cooperation rather than conflict between planetary research and galactic and extragalactic astronomy. It has not allowed them to come into conflict but has maintained constituencies for both."

Deborah Shapley

Biotechnology

Dutch go-ahead

Waalre, The Netherlands

The Dutch have at long last got their "innovation programme" for biotechnology, eagerly awaited since the beginning of the year (see *Nature* 14 January, p.91). A government-sponsored committee under the chairmanship of Professor R.A. Schilperoot, who works on recombinant DNA research at the University of Leiden, did not, as might have been expected, recommend setting up new centres for biotechnology along the lines of those planned in microelectronics. Instead his committee has opted for the rapid strengthening of cooperation between government institutes, universities and industry.

The committee urges that the government should provide extra support to stimulate innovation in biotechnology — at least an extra 75 million guilders between now and 1988. This money would come from the government's fund for industrial innovation and be in addition to the planned biotechnology budget, which is much larger.

Efforts should be concentrated on applied research, the committee concludes, especially in sectors where Dutch companies are traditionally strong — such as agriculture, the dairy industry, fermentation and antibiotics production. Areas highlighted for future research include the development of host-vector systems for use in applied research, somatic cell hybridization, second-generation biotechnological reactors for enzyme production and the isolation of useful products from process liquids.

Professor Schilperoot is confident that the existing large and medium-sized Dutch companies (such as Shell and Unilever) will be better able to tackle the challenge than would newly-formed small companies. Discussions on the regulation of recombinant DNA research went on in The Netherlands for far too long. Professor Schilperoot believes, badly holding up research; "The discussion should stop now. There certainly must be rules, but not stricter than necessary or stricter than in other countries. Permits to start work should be issued quickly, and the rules should be established nationally. Rules made by regional safety authorities have sometimes been too strict."

Schilperoot, who himself sometimes acts as an adviser to a foreign company, says that Dutch industry and universities often have extensive contacts abroad at the expense of national cooperation. "Better structures here would create a favourable climate that would encourage more confidence in this field and put The Netherlands in a strong position in 5 years' time and have a great impact on society and industrial activity in the next 10 to 20 years."

Casper Schuurin